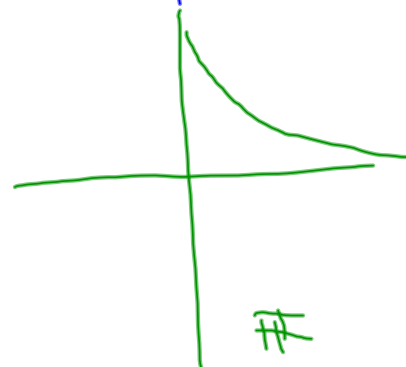
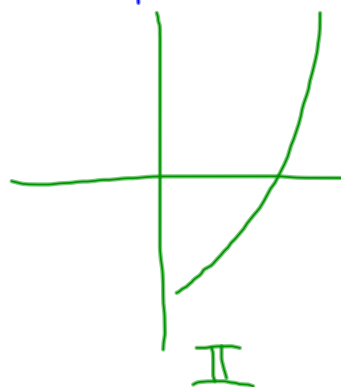
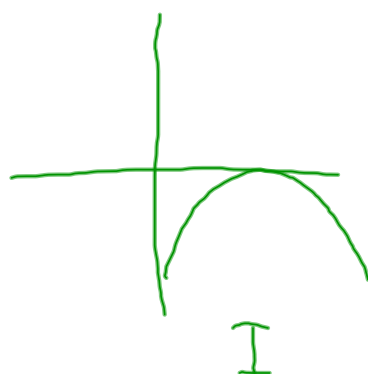
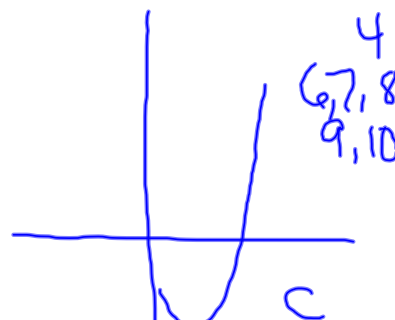
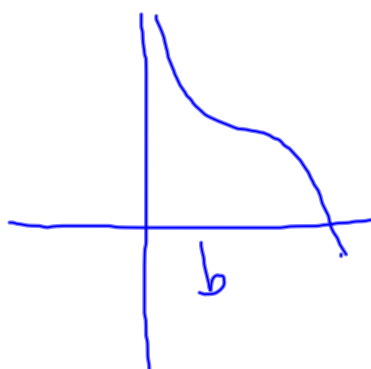
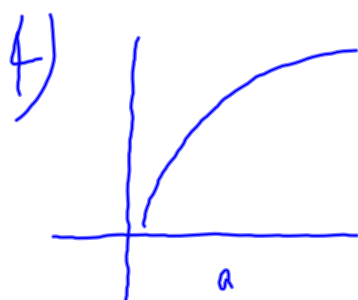


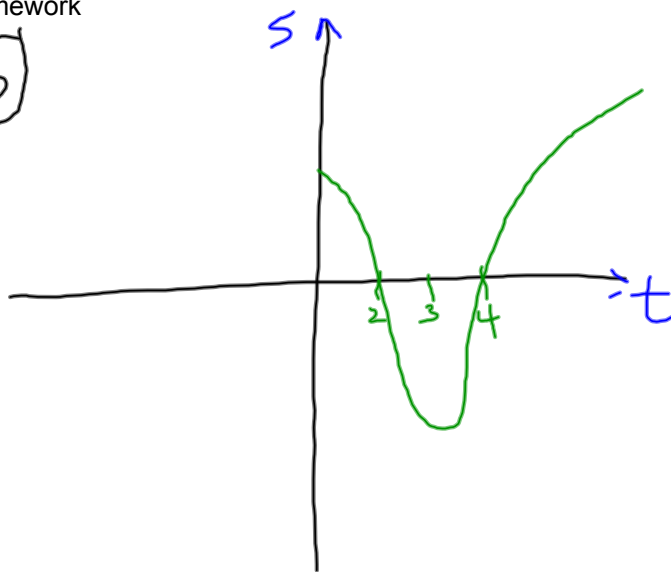
5.4 homework

2010-12-13 Pd 2



5.4 homework

6



2010-12-13 Pd 2

a) when is the ant above the origin?

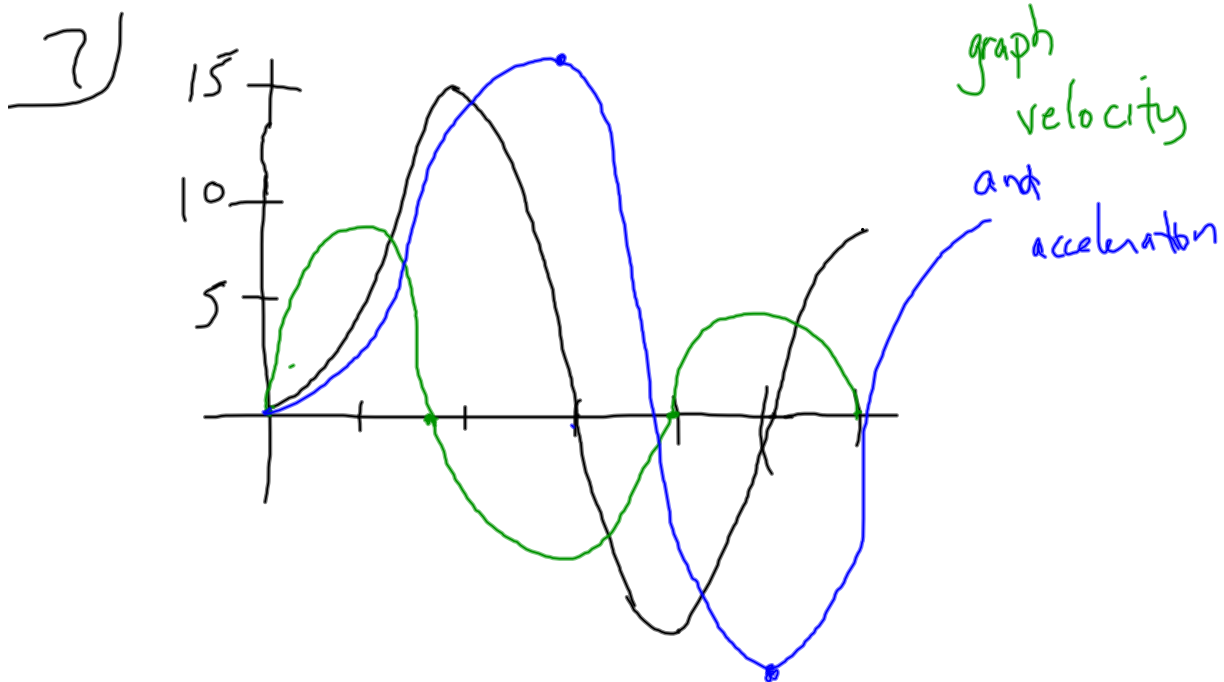
b) when if ever does the ant have zero velocity

c) when is the ant moving down the pipe?



5.4 homework

2010-12-13 Pd 2



12) $s(t) = t^4 - 4t + 2, \quad t \geq 0$

a) $v(t) = s'(t) = 4t^3 - 4$

b) $a(t) = s''(t) = v'(t) = 12t^2$

c) "stopped" $\equiv v(t) = 0$ & solve for t

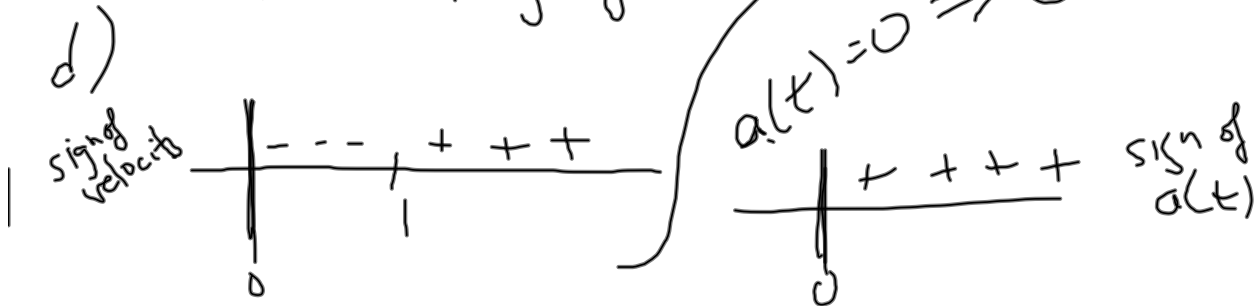
$$4t^3 - 4 = 0 \Rightarrow 4(t^3 - 1) = 0$$

$$\Rightarrow 4(t-1)(t^2+t+1) = 0$$

\hookrightarrow discriminant < 0

$$\Rightarrow t = 1$$

no checking reqd.



v neg	v pos
a pos	a pos
slowing down	speeding up

5.4 homework

2010-12-13 Pd 3

5) sketch a reasonable graph:

A mouse runs right @ 1.2 m/sec for a while

gradually slows down to 0.6 m/sec

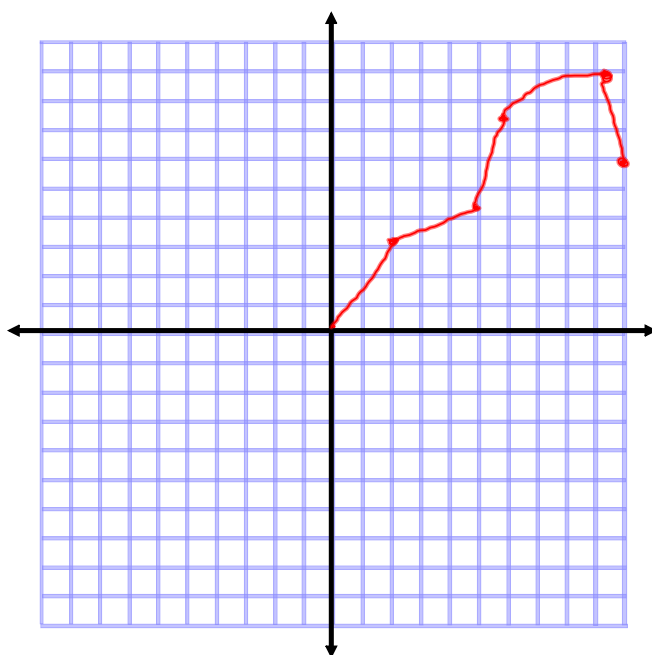
quickly speeds up to 2.0 m/sec

gradually slows to a stop; reverses direction, speeds up to 1.2 m/sec

9a

5

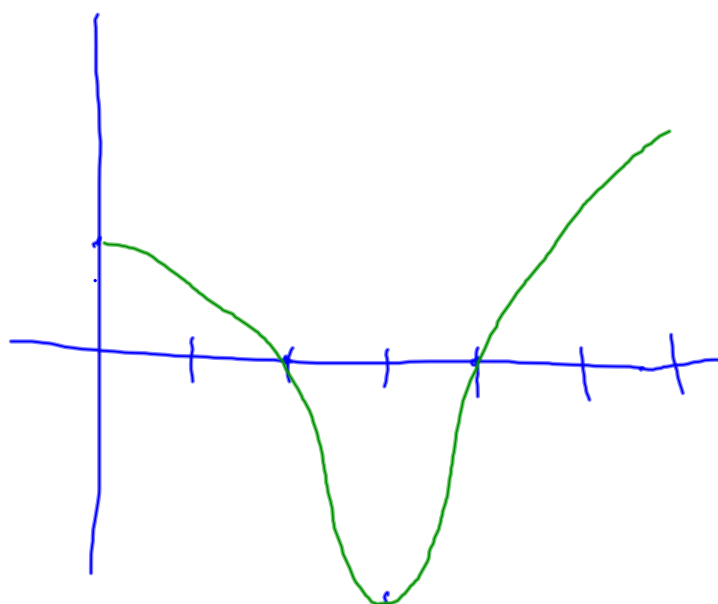
7 10



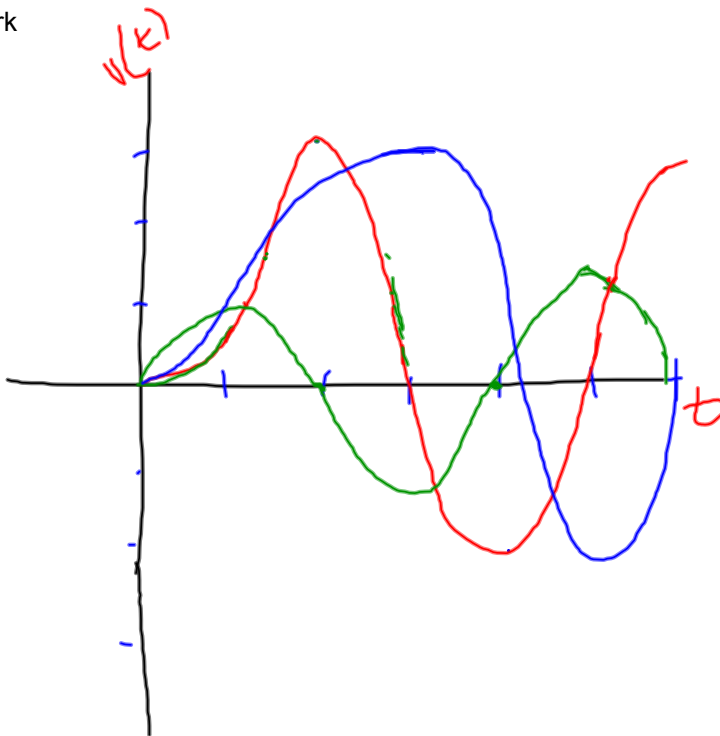
5.4 homework

7)

2010-12-13 Pd 3



5.4 homework



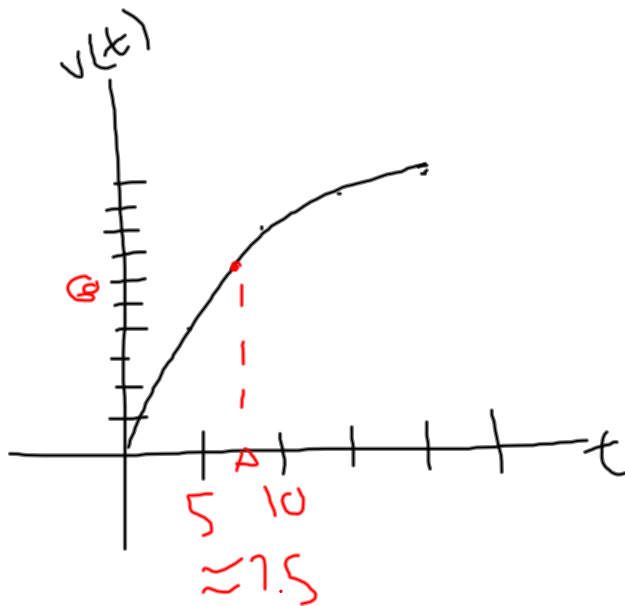
2010-12-13 Pd 3

sketch a
graph of
position
and
acceleration





9a)



a) acc
at 60 mph.

$$a = \Delta v / \Delta t$$

$$\frac{v}{s} = a$$

$$60 \text{ mph} = \frac{\text{ft}}{\text{sec}}$$

$$60 \text{ mi} \cdot \frac{5280 \text{ ft}}{\text{mi}} \cdot \frac{1}{\text{hr}} \cdot \frac{1}{3600 \text{ sec}} = \frac{\text{ft}}{\text{sec}}$$

$$\frac{60 \text{ mph}}{7.5 \text{ s}} = 8 \text{ mph/s}$$



10) $\sin\left(\frac{\pi t}{4}\right) = \text{pos}^n f^n$
 s in meters t in s

1) Make a table

t	$\sin\left(\frac{\pi t}{4}\right)$ posn	$\frac{\pi}{4} \cos\left(\frac{\pi t}{4}\right)$ v	$-\frac{\pi^2}{16} \sin\left(\frac{\pi t}{4}\right)$ a
0	0	$\frac{\pi}{4}$	0
1	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}\pi}{8}$	$-\frac{\sqrt{2}\pi^2}{32}$
2	1	0	$-\frac{\pi^2}{16}$
3	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}\pi}{8}$	$-\frac{\sqrt{2}\pi^2}{32}$
4	0	$-\frac{\pi}{4}$	0
5	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}\pi}{8}$	$\frac{\sqrt{2}\pi^2}{32}$

12d) $s(t) = t^4 - 4t + 2, t \geq 0$

12d



$$v(t) = 4t^3 - 4$$

$$a(t) = 12t^2$$

$$a(t) = 12t^2 \geq 0$$

$$4t^3 - 4 = 0$$

$$4t^3 = 4$$

$$t^3 = 1$$

$$t = \sqrt[3]{1}$$

$$t = 1$$

t	$s(t)$
0	2
1	-1
5	607

$d=3$
 $= 608$

$t=5$
 what is d
 611

-----|+++++

$$\left[x(1) - x(0) \right] + \left[x(5) - x(1) \right]$$

$$t^4 - 4t + 2 \quad (1 - 4 + 2) - (2)$$

$$54 - 20 + 2 \quad \rightarrow +2 = -1 - 2 = -3 \mid 3$$

$$527 - 20 = 607 + 1 + 3 = 611$$

5.4 homework

2010-12-14 Pd 3



5.4 homework

2010-12-14 Pd 3



5.4 homework

2010-12-14 Pd 3

